

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
17 June 2004 (17.06.2004)

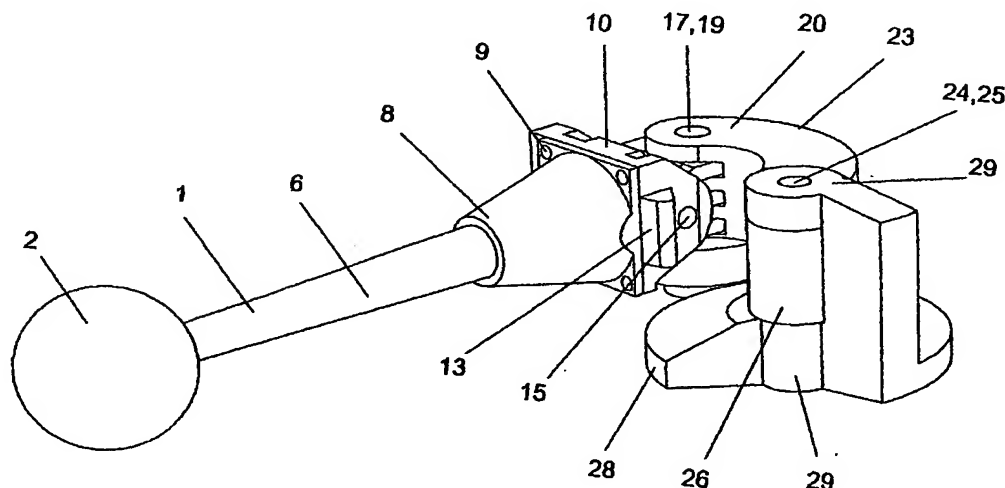
PCT

(10) International Publication Number  
**WO 2004/050195 A3**

- (51) International Patent Classification<sup>7</sup>: **A63B 69/00**, 69/36
- (21) International Application Number:  
PCT/IE2003/000160
- (22) International Filing Date: 3 December 2003 (03.12.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
S2002/0934 3 December 2002 (03.12.2002) IE
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- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— with international search report  
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: GOLF SIMULATOR OR MEASUREMENT APPARATUS



(57) Abstract: The invention provides a simulator or measurement apparatus for use in a bail game where a ball is hit from a stationary position. The apparatus includes a bail (2), a connecting means (1), a base (48) and a measurement means. The ball (2) is connected by the connecting means (1) to the base (48). The connecting means (1) operates to provide a number of degrees of freedom to the movement of the ball (2), and is in a unique arrangement for each position of the bail. It operates to allow the bail (2), when struck by an object, to substantially replicate some or all of the motion characteristics of an unconnected ball, over a distance sufficient to measure such motion characteristics. The measurement means measures motion characteristics of the connected ball (2) over the distance when such motion characteristics are substantially replicated.

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**(88) Date of publication of the international search report:**  
16 September 2004

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International Application No

IE 03/00160

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A63B69/00 A63B69/36

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 1 976 405 A (LE WITT GEORGE) 9 October 1934 (1934-10-09)	1,2,4,5, 9,14-17, 29, 42-44, 46,48, 115 80
Y	the whole document	
X	US 5 255 920 A (MANGERI JOHN J) 26 October 1993 (1993-10-26)	1,2,4,5, 9,29,42, 44-46, 48-50, 55-60, 66,67, 79,115
	column 2, line 40 -column 3, line 43; claim 1; figures 2-4,6 -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

5 July 2004

Date of mailing of the international search report

12 07. 2004

Name and mailing address of the ISA,

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## INTERNATIONAL SEARCH REPORT

onal Application No

PCT/ISA/210 03/00160

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 257 989 B1 (TORTOLA ANGELO ET AL) 10 July 2001 (2001-07-10)  column 2, line 15 - line 33 column 5, line 59 -column 6, line 17 column 7, line 19 - line 29; figures 1-3 column 2, line 57 -column 3, line 10 column 4, line 4 - line 47 ---	1,2,4,5, 29, 42-46, 48-50, 55-60, 67,79, 115
X	US 4 407 503 A (NISHIZAWA HIDEYUKI) 4 October 1983 (1983-10-04) column 1, line 43 - line 58; figures 1,2 ---	30-32; 36,38-41
X	US 3 452 990 A (NICHOLS EDGAR B) 1 July 1969 (1969-07-01)  column 2, line 51 -column 3, line 60 ---	30-36, 38-41, 67, 90-101 1-29
A	US 2 926 919 A (HALLORAN AARON J) 1 March 1960 (1960-03-01) column 2, line 29 -column 3, line 36; figures 1,2 ---	67
X	US 3 656 759 A (HALL RICHMOND E) 18 April 1972 (1972-04-18) column 1, line 20 - line 61 column 6, line 39 - line 50 claims 1-3; figures ---	1-5, 42-48,67
X	GB 2 230 460 A (MACHIN JOHN THOMAS) 24 October 1990 (1990-10-24)  page 1, paragraph 1 -page 2, paragraph 1; figure 1 page 3, paragraph 3 -page 4, paragraph 1 ---	30,31, 33-36, 38-43, 46,48
X	DE 36 36 515 A (GRENFELDT RUNAR) 28 April 1988 (1988-04-28)  column 3, line 10 -column 4, line 20 column 5, line 1 -column 6, line 45; figures 2-4 ---	42, 44-50, 55-60, 62-66
Y	US 2002/128092 A1 (BOLIN DARRIN) 12 September 2002 (2002-09-12) paragraph '0017! - paragraph '0024!; figure 6 --- -/--	80

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/IL 03/00160

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SU 1 377 127 A (GI FIZICHESKOJ KULTURY IM P F) 28 February 1988 (1988-02-28) figures	1-29, 67-79
A	US 6 129 637 A (WANG CHIH-NENG ET AL) 10 October 2000 (2000-10-10) the whole document	1-29
A	US 5 417 427 A (DOANE MAURICE S) 23 May 1995 (1995-05-23) the whole document	1-29

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IE 03/00160

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☒ Claims Nos.: 114, 116  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-29 (and 102-113 and 115 if they are depending on 1-29)

PROBLEM : How to replicate some of the motion characteristics of an unconnected ball

SOLUTION : To provide the simulator with a connecting means which is operable to provide at least three degrees of freedom and a replicated motion characteristics is substantially straight line movement

2. Claims: 30-41 (and 102-113 and 115 if they are depending on 30-41)

PROBLEM : How to minimize the moment of inertia of the connecting means compared to the moment of inertia of the ball

SOLUTION : To manufacture the connecting member from a high strength-to-weight material

3. Claims: 42-66 (and 102-113 and 115 if they are depending on 42-66)

PROBLEM : How to measure the motion characteristics of the golf ball

SOLUTION : To provide a sensing means

4. Claims: 67-79 (and 102-113 and 115 if they are depending on 67-79)

PROBLEM : How to provide improved ability of measuring the spin characteristics of the golf ball

SOLUTION : To provide the simulator with a connecting means which is operable to allow the ball to spin around two different set axis

5. Claims: 80-89 (and 102-113 and 115 if they are depending on 80-89)

PROBLEM : How to provide a more realistic golf simulator

SOLUTION : To provide the simulator with a measurement means which is operable to determine the motion characteristics of an unconnected ball by comparison of these input signals corresponding to previous shots with known motion

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

characteristics

6. Claims: 90-101 (and 102-113 and 115 if they are depending  
on 90-101)

PROBLEM : How to provide a better/safer connection between  
the ball and the connecting means

SOLUTION : To provide the connecting means with flanges or  
projections



FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 114,116

Claims shall not, except where absolutely necessary, rely on references to the description or drawings Rule 6.2(a) PCT. This is not considered such a case.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

# INTERNATIONAL SEARCH REPORT

Initial Application No

E 03/00160

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 1976405	A	09-10-1934	NONE	
US 5255920	A	26-10-1993	NONE	
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US 5417427	A	23-05-1995	NONE	